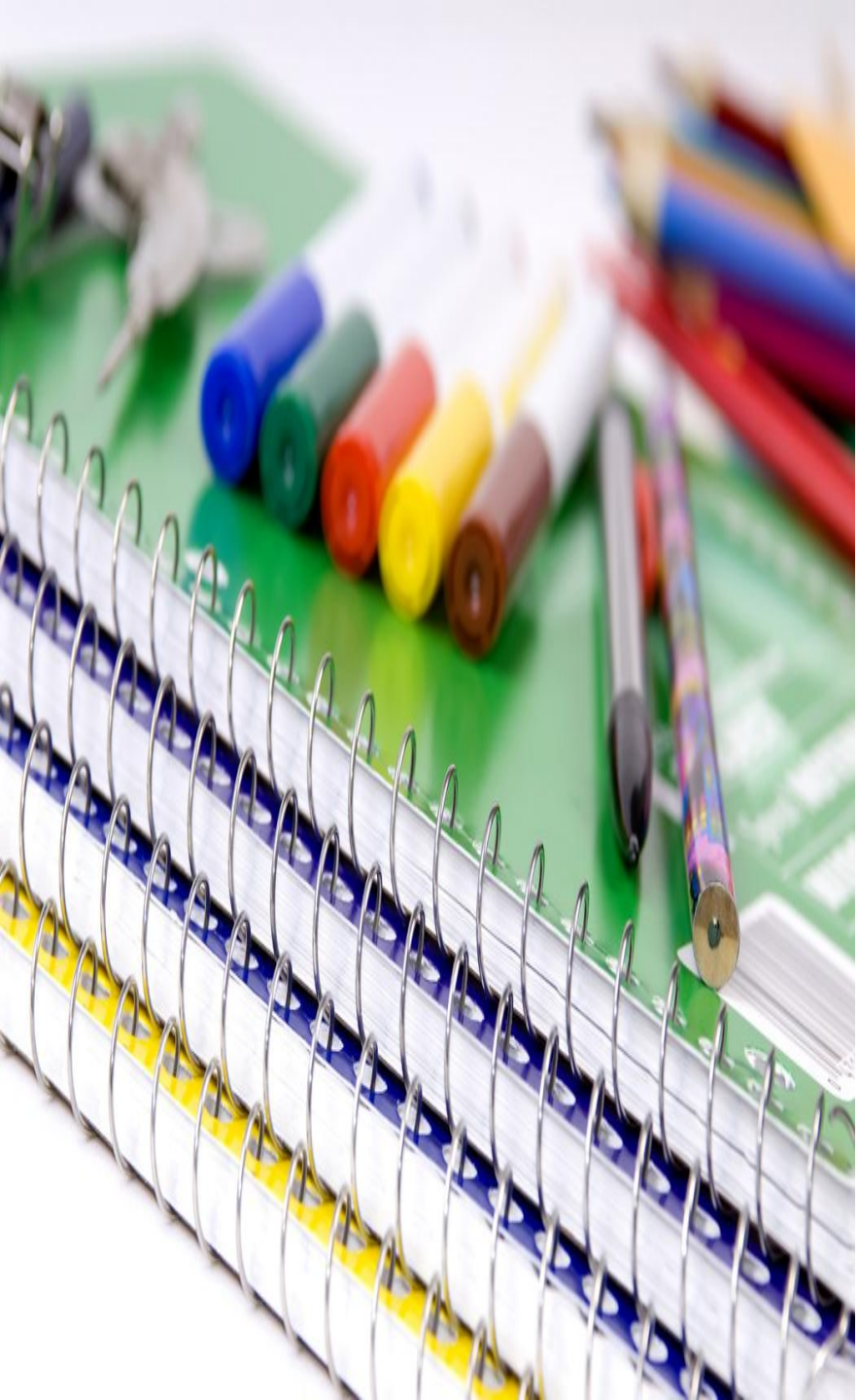

How Do I Know What They Know? Building your Toolkit of Assessment Strategies

PRESENTED BY

Beatrice Moore Luchin
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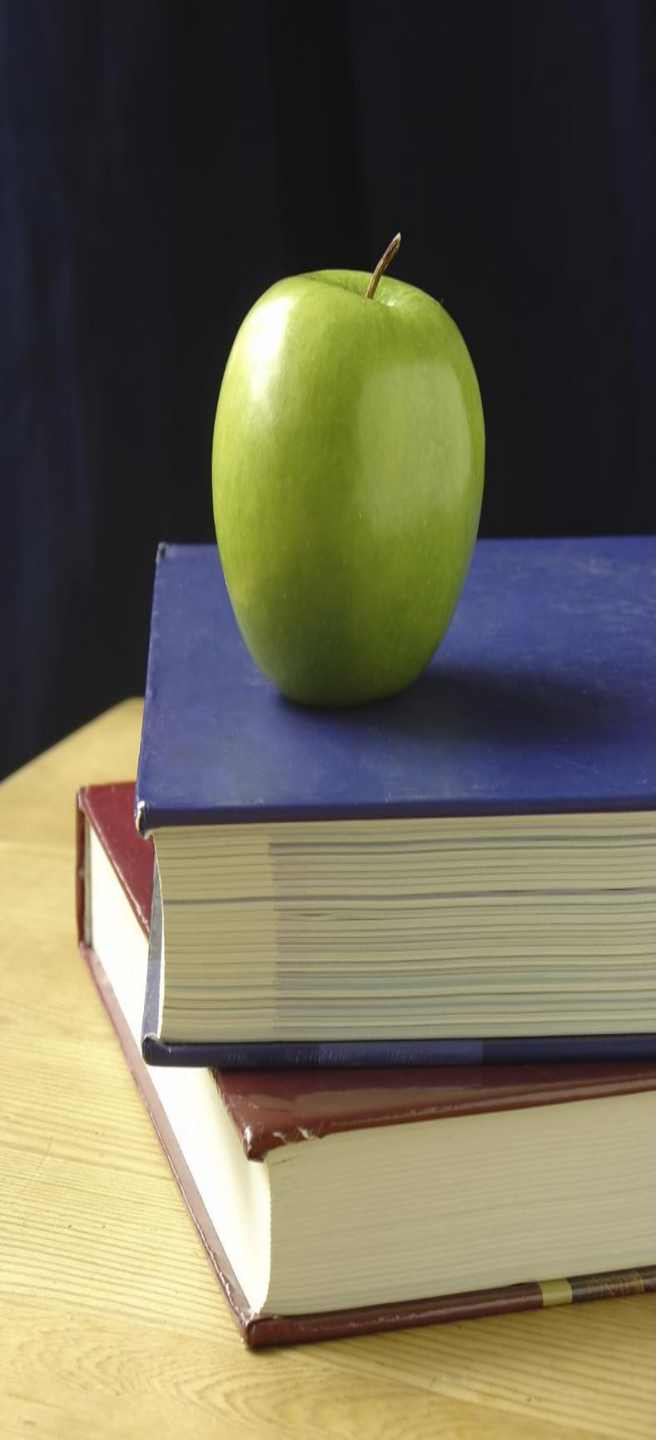
WELCOME

Ground Rules for the day-

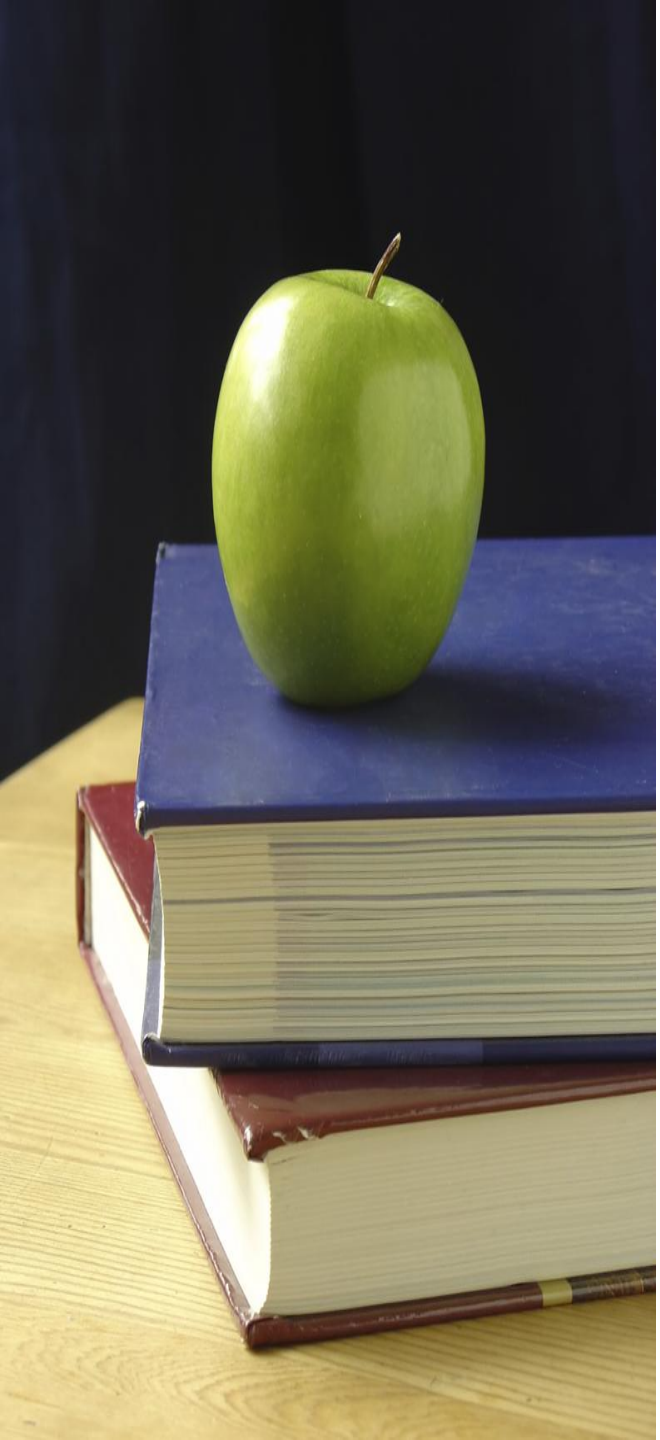
- Plan to make the most of this training
- Participate in all group activities
- Ask questions to clarify instructions, key points, discussions



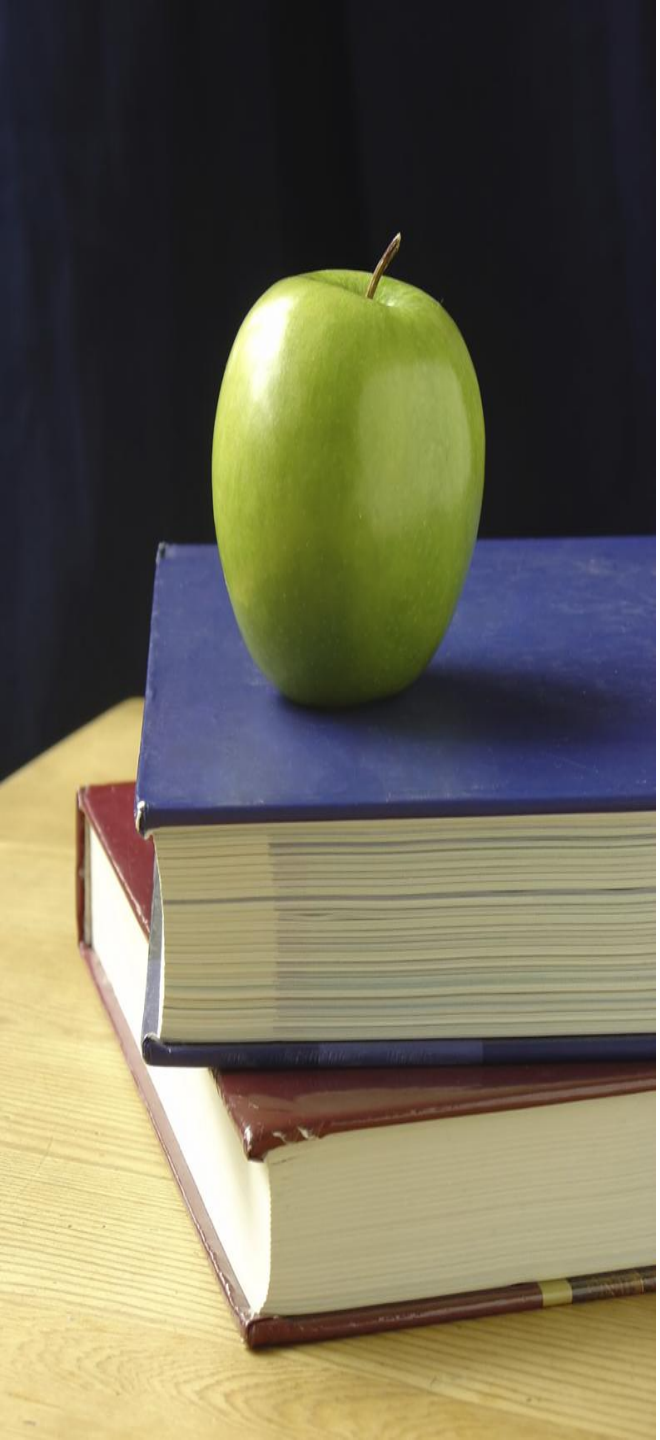
Goals:

Participants will learn to effectively use Graphic Organizers (GOs) and be able to—

- Understand how the use of effective questioning strategies support preparation of students for the rigor of various assessments including: ACCESS for ELLs®, PAAP, MEAs, NECAP, ACT, SATs, etc
- Expand their understanding of various assessment strategies for individual and small group instruction



- Develop an understanding of the nature and function of questions related to increasing mathematical content knowledge
- Develop skills in question construction



- Learn how content and academic vocabulary can be developed and assessed through the uses of appropriate questioning strategies and the use of graphic organizers

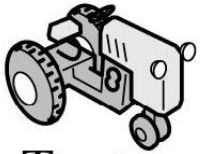
- Design writing prompts that are appropriate for mathematics content

Morning break 10:00-10:10

Lunch: noon – 1:00 p.m.

Reflection
&
Evaluation
2:45

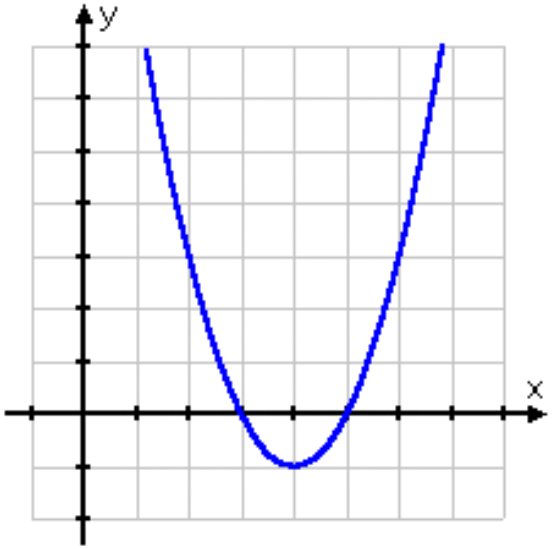
Elementary



Middle

Day	Temperature
Sunday	72° F
Monday	63° F
Tuesday	58° F
Wednesday	64° F
Thursday	72° F
Friday	68° F
Saturday	54° F

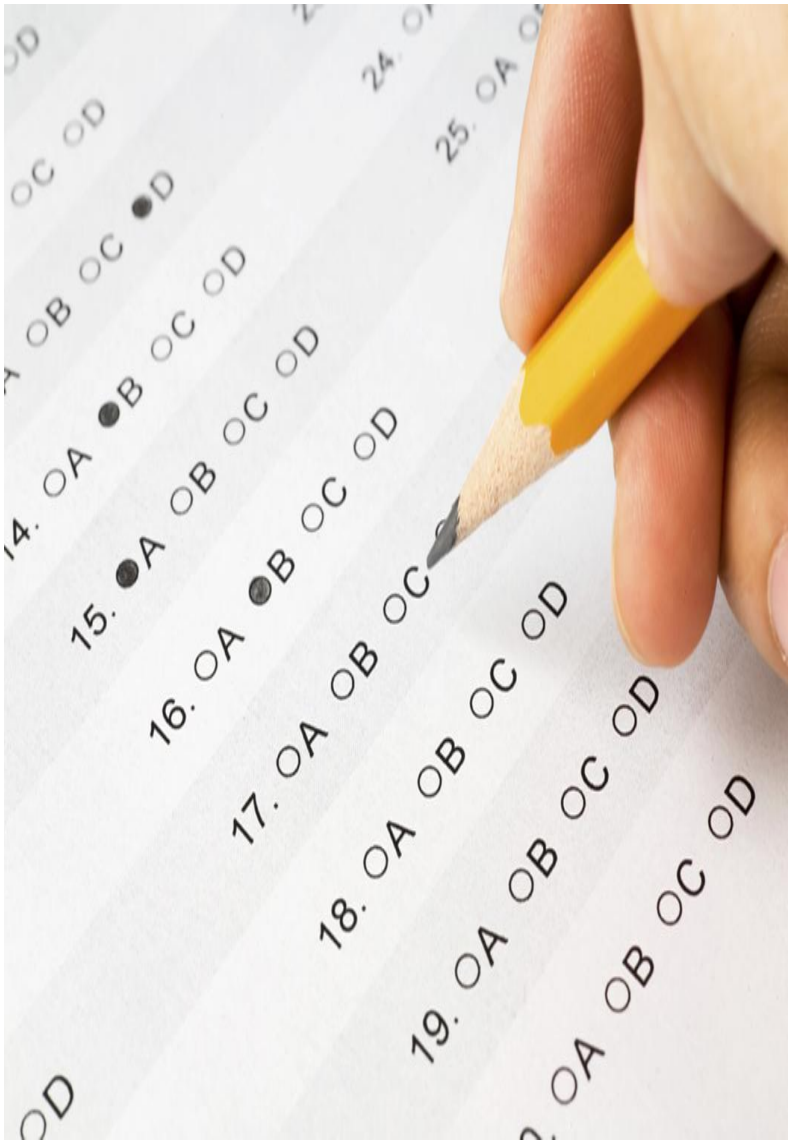
High School



Select a problem context from above.
Write five questions for the problem context you selected

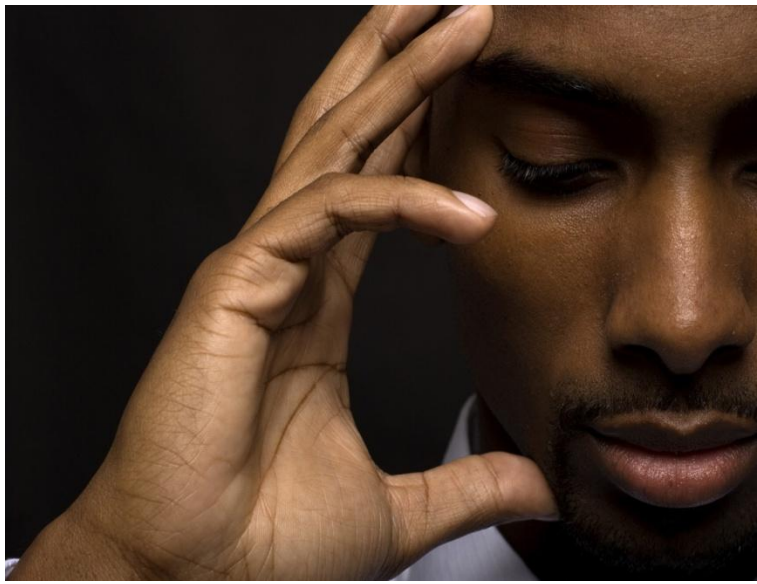
Why Ask Convergent Questions?

Convergent thinking questions are those which represent the analysis and integration of given or remembered information. **They lead you to an expected end result or answer.**

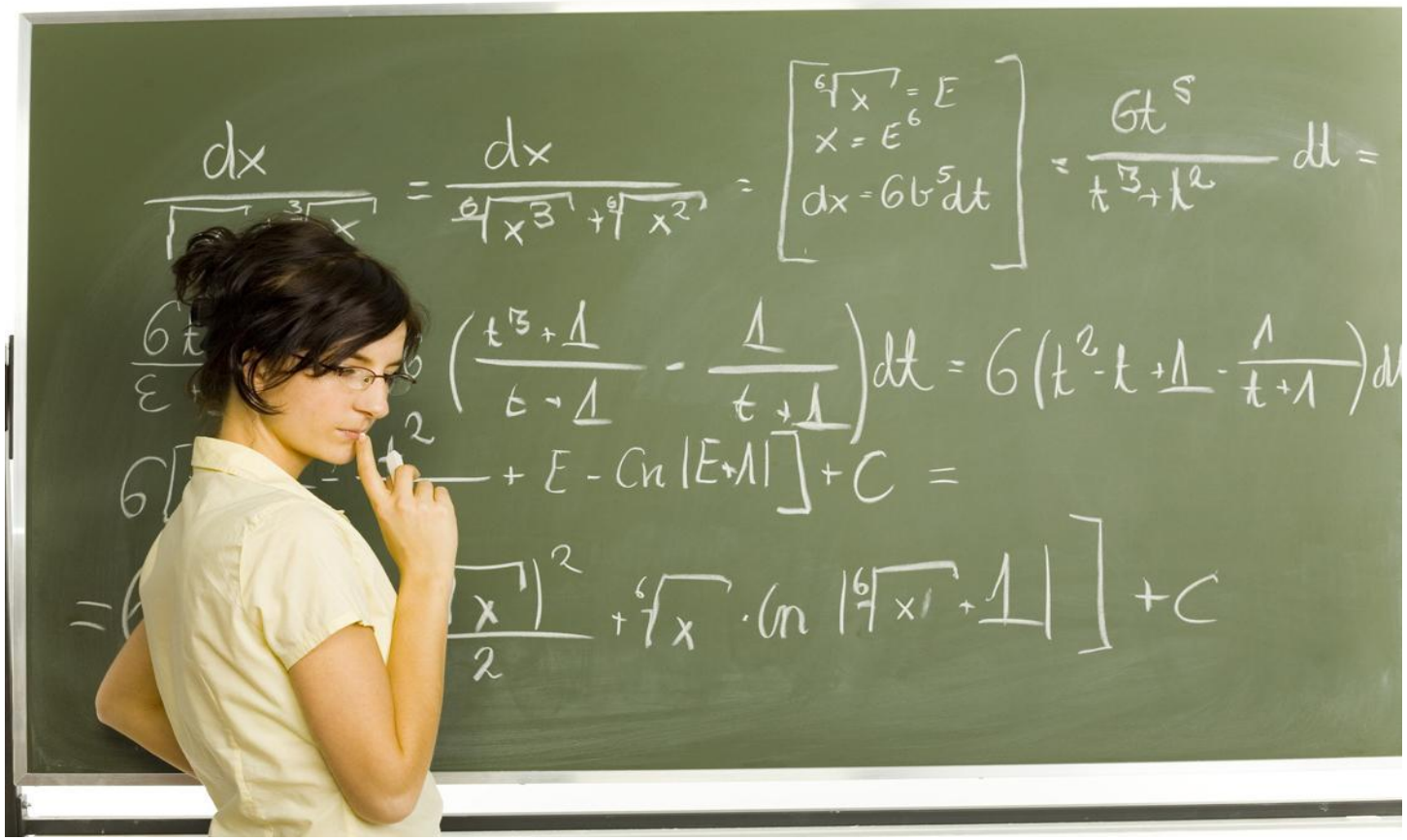


Divergent

Divergent thinking questions are those which represent intellectual operations wherein you are free to generate independently your own ideas, or to take a new direction or perspective on a given topic.



- **Divergent thinking questions usually begin with these words or phrases:** Imagine...Suppose...Predict...If..., then...How might...Can you



Closed or restricted response

- What gas is the largest component of air?
  - Response: Nitrogen
- What is the sum of 2+2?
  - Response: 4
- What is the name of this polygon?

  - Response: trapezoid

- Use: Closed-ended questioning is useful when you want to know what specific knowledge a student has acquired.

Opened-ended or extended response

How would you describe the air?

Possible response:

Air is a mixture of gases including nitrogen, oxygen and carbon dioxide as well as dust and pollen.

Types of Responses

- Graphical
- Verbal
- Pictorial
- Numerical

ACT

- A scuba diver often sends up a balloon-type marker. The marker starts out fairly small and gets larger as it approaches the surface. The chart below shows the marker's volume at multiples of 33 feet below the surface of the water. Which of the following equations fits these data?

SAT

- Three parallel lines in a plane are intersected by a fourth line, forming twelve angles. If one of the angles has measure 28°, how many of the other eleven angles have measure 28°?

ACT

- In the graphs below, all axes have the same scale. One of the graphs shows $y = 3x + 1$. Which is that graph?

AP Calculus

5. As shown in the figure above, water is draining from a conical tank with height 12 feet and diameter 8 feet into a cylindrical tank that has a base with area 400π square feet. The depth h, in feet, of the water in the conical tank is changing at the rate of (h-12) feet per minute. (The volume V of a cone with radius r and height h is $V = 1/3\pi r^2 h$.)

(a) Write an expression for the volume of water in the conical tank as a function of h.

(b) At what rate is the volume of water in the conical tank changing when h = 3? Indicate units of measure.

(c) Let y be the depth, in feet, of the water in the cylindrical tank. At what rate is y changing when h = 3? Indicate units of measure.

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AP Calculus

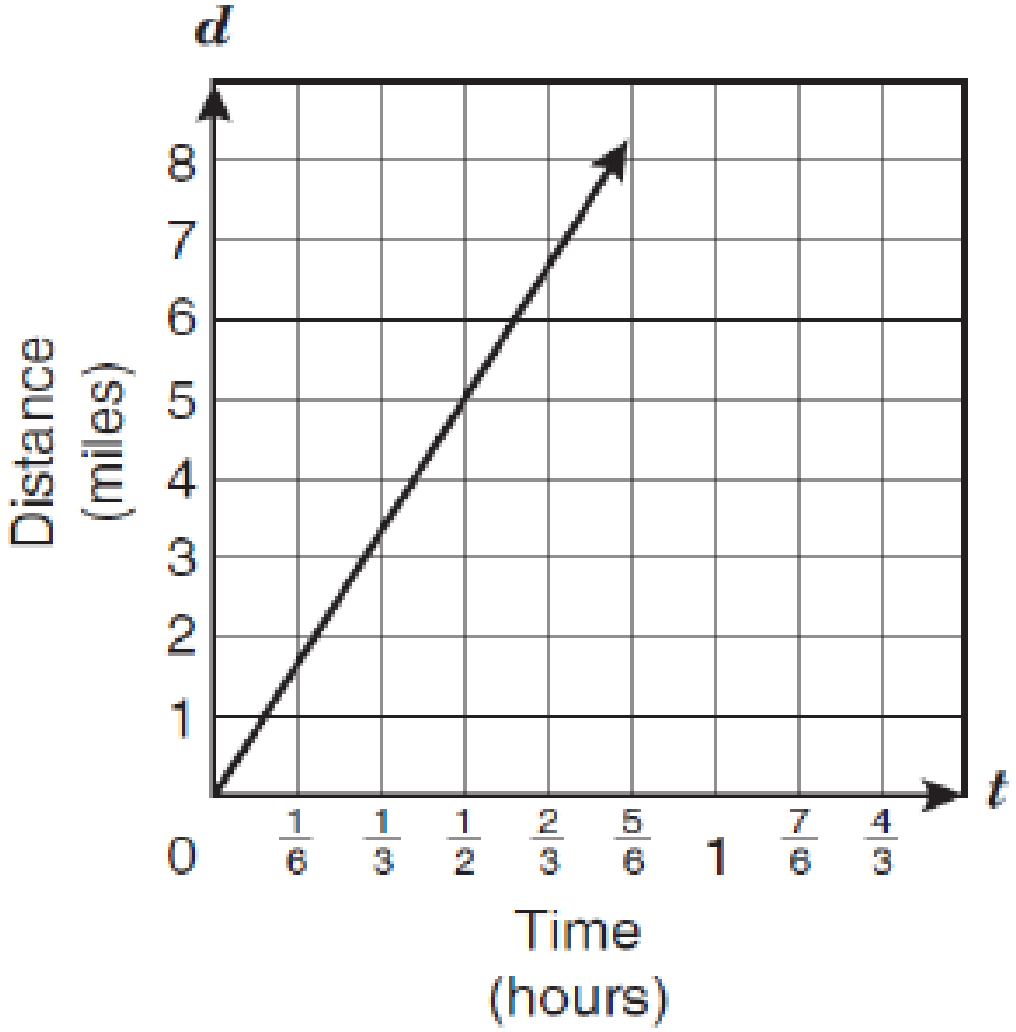
- You are planning to sell a used 1988 automobile and want to establish an asking price that is competitive with that of other cars of the same make and model that are on the market. A review of newspaper advertisements for used cars yields the following data for 12 different cars of this make and model.

- Draw a scatter plot of the data. Remember to scale and label both axes.
- Because of the apparent curvature of the graph, you decide that an exponential function would be a better model for this data. Write an exponential model for this data. Does the exponential function seem to be a good model for the data? Explain why or why not.

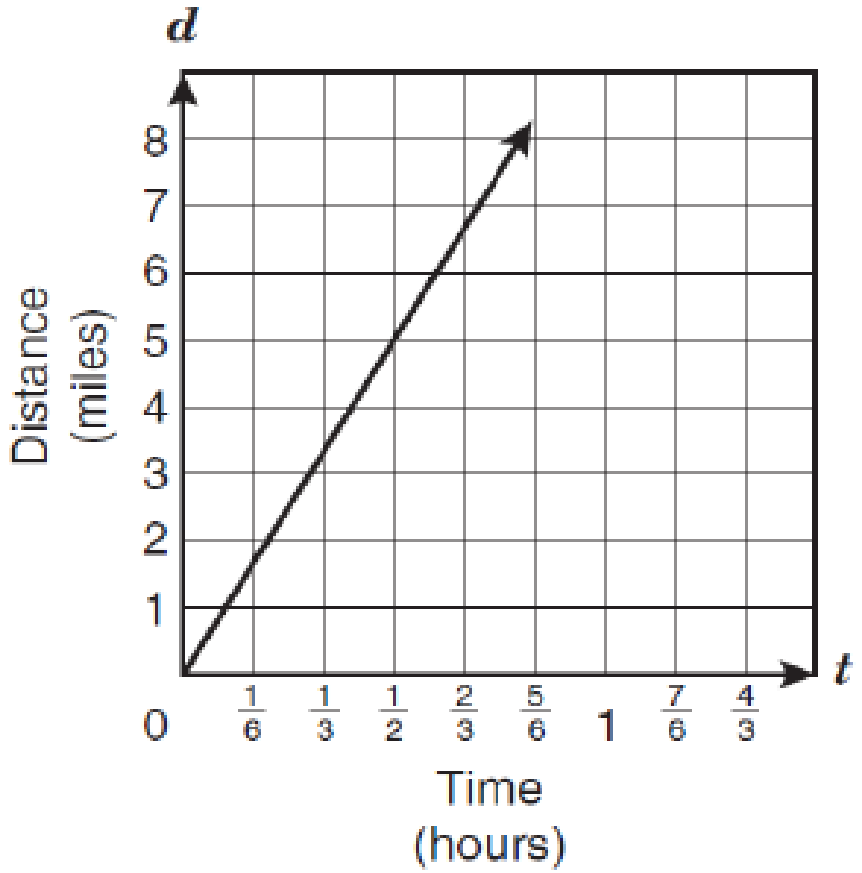
- Use the exponential function to determine a selling price for your 1988 automobile.
- Your friend thinks that the data would be better represented by using two line segments. Write a piecewise function for the data using two lines or segments of lines.
- Use your piecewise defined function to determine a selling price for your 1988 automobile.

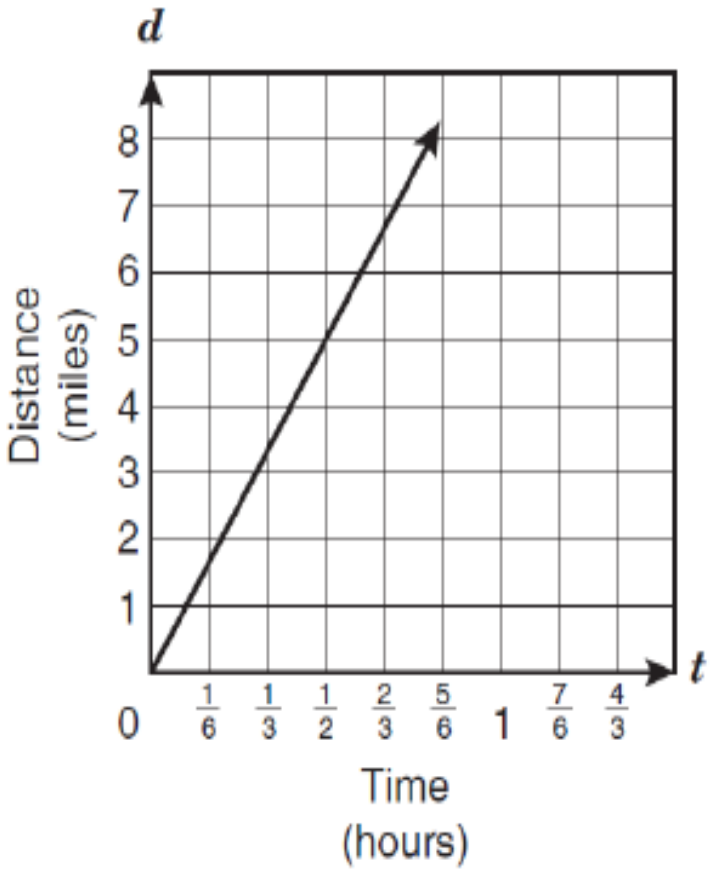
- A friend bought a new car last year and he decides to sell it now. Use your exponential model and your piecewise model to predict the price of this car. Which of the two prices would be the most accurate and why?
- Based on your answer to questions 2-6, decide which model, exponential or piecewise, is a better mathematical model for this situation. Explain why you chose this model.

Write a paragraph that describes the graph.



Write a paragraph that best describes the relation shown between time and distance.





Write a paragraph that best describes the relation shown between time and distance.

Use the following helper words in your writing:

slope **constant** **rate**
increase **decrease** **time**
distance **hours** **minutes**
compare **relationship**
increments **x-axis**
y-axis **data** **independent**
dependent **function**

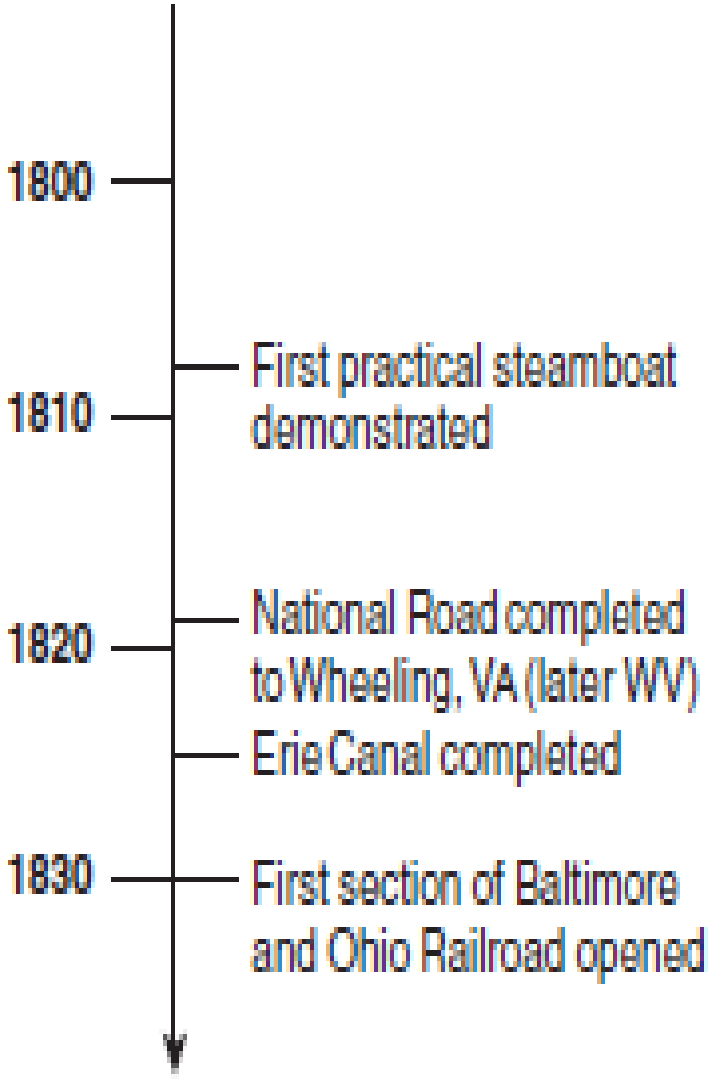
Academic Language

EXAMPLES

Which of the following is the best example of competition between birds?

Which of these actions is a learned behavior of a pet dog?

- The diagram shows a modified water cycle. Which of the following best describes the process in which surface water becomes water vapor?
- If the entertainment center costs the same at each store, which store requires the smallest down payment?
- Which set of coordinates best represents a reflection of ΔDEF *across the y-axis?*



Which of these is the best summary of the information shown?

- **It took a long time for railroads to become** popular.
- **New inventions and engineering** techniques led

to waterway construction.

- **Technical innovations and internal** improvements

created new travel options.

- **Transportation depended primarily on private investment**

Academic Language

- Not
- Represent
- Describes
- Effect
- Expression/equation
- Reasonable
- Determine
- Solution
- Calculate
- What method or procedure…
- Dimensions
- Compare
- Approximate
- What conclusion can be drawn…
- Based on the data…
- Which statement best describes…
- True/not true
- Representing
- Equivalent

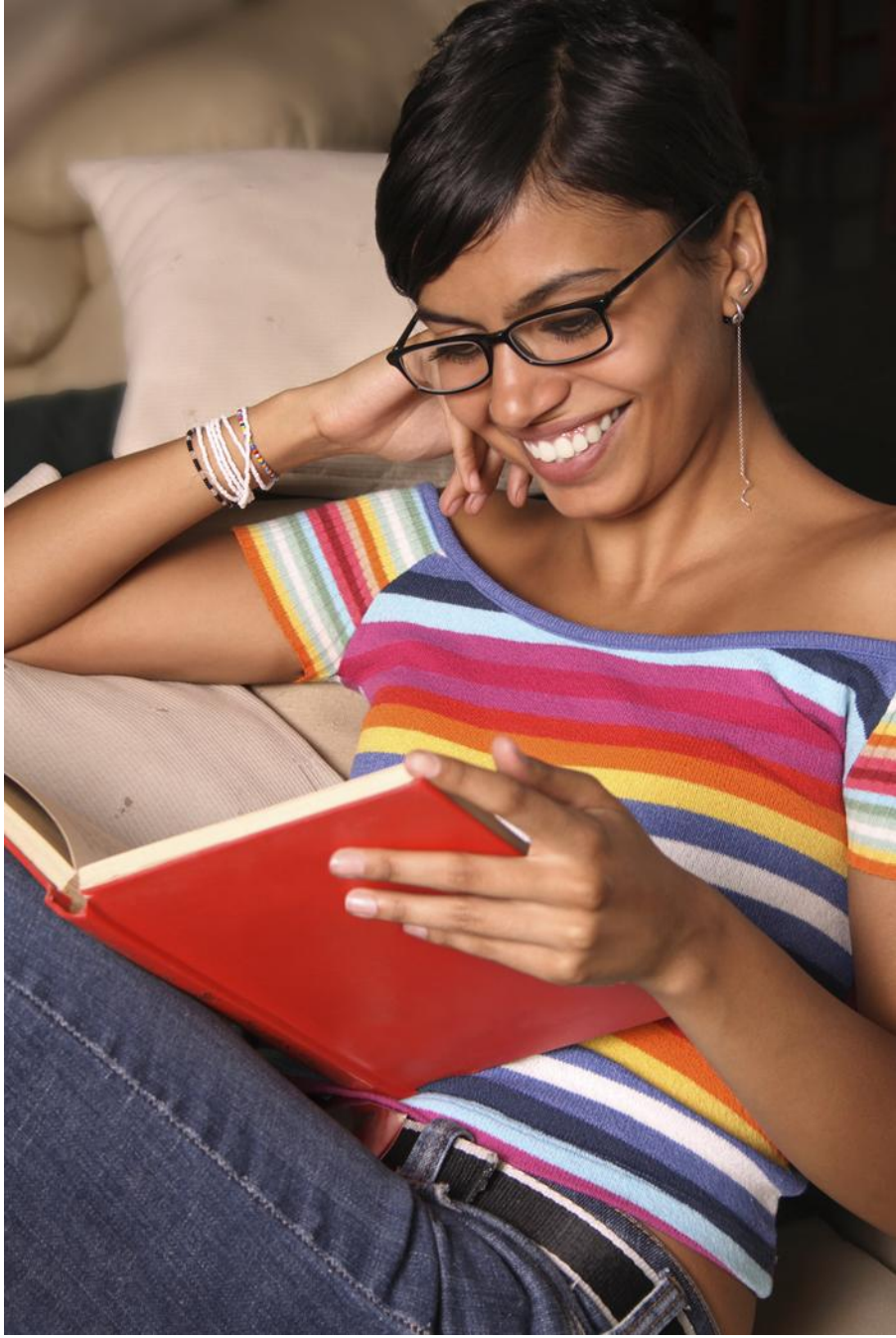
Reflect, Evaluate & Revise

- Review your questions.
- Select a focus.
- Revise/Construct 5 questions that reflect what you have learned today about questioning.

You have 15 minutes

Read Reflect pages 3 and 4

- Identify and discuss key point raised in the reading.
- What are the implications for you individually? What needs to change and/or stay the same?



Strategies for Practice and Application

A-B-C Summarize

At your table is

- **a card with a math topic**
- **a set of alphabet cards**

Distribute the alphabet cards evenly among the group members

You have 30 seconds to brainstorm words or phrases related to the topic

Compile a list for the group and be sure you are in agreement.

Active Learning

Your group has been given an active learning strategy.

Brainstorm topics that might work well with your strategy.

Based on the information on pages 3 and 4, what type of assessment would this strategy be best used as?

Affinity

- Application Problems
- Cloze Activities
- Learning Log

Application Problems

Each person gets 5 slips of paper.

Write your individual responses to the steps of the problem on separate slips- **do not number the slips.**

Then each member **silently** groups the slips.

- After a discussion, record the agreed upon arrangement
- Post slips on Chart Paper to create a display for the whole group

Application Problem

1 APPLICATION

A student will paint a design to completely cover the lateral surface area of a cylindrical container. The container is 25 inches tall and 7 inches in diameter. What is the approximate area that the student will have for the design?

2 KEY VOCABULARY

3 VISUAL

4 FORMULA

5 CALCULATION

6 SOLUTION

Cloze Activity

ratio word proportions number 15 20

_____ are built from ratios. A _____ is just a _____between two different things. For instance, you can refer to the "ratio of boys to girls" in the class. Suppose there are thirty-five students, fifteen of whom are girls. Then the ratio of boys to girls is _____ to _____. This order is very important, and must be respected: whichever _____came first, its _____ must come first. If the expression had been "the ratio of girls to boys", then the ratio would have been "_____ to _____". There are two other notations for this ratio of boys to girls. They are _____**:** _____and _____

Journal

used to encourage reflection or exploration of ideas

typically not graded

can be used to establish an ongoing written dialog

Learning Log

write responses to teacher questions as summary of what they have learned or what they do not understand.

used for reflection and to inform teacher of progress

Learning Log

Directions: Use the following terms to write a paragraph that describes the properties of a circle.

chord	**center**		**ratio**	
circumference		**diameter**	**point**	**linear**
measure		**degrees**	**area**	**pi**
perimeter	**radius**			

Closure Idea

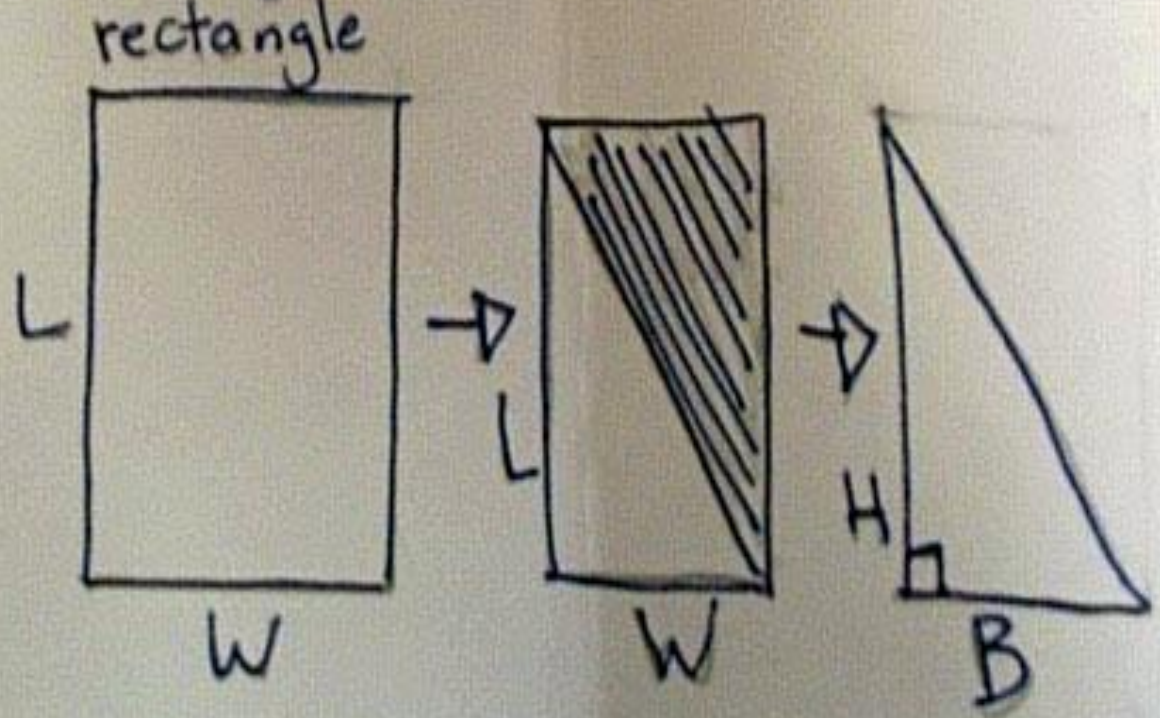
Exit Tickets:

Provides a quick assessment tool for teachers to become better aware of student understanding

If an educator decides to assign a mark to the exit slip it then becomes part of the evaluation and not the assessment.

It must be made clear to the students what the exit slip is being used for.

The formula of a right angle triangle is $A = \frac{b \times h}{2}$ because a right angle triangle is a rectangle in half, so the "b" stands for base and the "h" stands for height. The base is the width of the rectangle and the height is the length of the rectangle, example:



Exit Prompts

- Write one thing you learned today.
- Write one question you have about today's lesson.
- Of the 3 graphs we studied today which one did you find most useful? Why?
- Name one positive and one negative thing that happened during group work today.
- Multiply 3.45 by 2.4
- In your own words explain why the formula for a right angle triangle is 1/2 b x h.

They can be used to frame the work to be done in class and establish a purpose for the upcoming class.

- I have questions about terms found on pages…..
- I think the chart on page 245 proves that….
- The three most interesting things I learned were….
- I need to ask about these three points…..
- The thing I found most challenging about this assignment was…
- The thing I found most enjoyable about this assignment was
- I am still confused about the idea of…

1	2	3
• exit slip is blank or is impossible to understand.	• exit slip is difficult to read or understand.	• exit slip is organized and easy to understand.
• student makes no effort to answer the question. Simply writes "I don't know.	• exit slip makes very little attempt to answer the question that was asked.	• student has made a serious attempt to answer the question posed by the teacher.
• no effort has gone into exit slip.	• minimal effort has gone into exit slip.	• evident that effort has gone into exit slip

VARIATIONS

A Verbal Exit Ticket Have students line up at the door at the end of the period and as they leave they must share an idea or concept they learned from that class. Each student must give a different answer. As the students stand in line, they can discuss different possibilities with their peers.

Admission Ticket Students record a fact, concept, or question related to their homework or previous lesson and hand it in as they enter the classroom. The teacher may prefer to assign a guiding question. An admission ticket serves as a great technique for homework check.

Anticipation/Reaction Guide

Read each statement. Write A if you agree with the statement. Write D if you disagree with the statement.

Response Before Lesson	Statement/Application	Response After Lesson
	A **function** is a set of ordered pairs (x, y) in which each x-coordinate is paired with only one y-coordinate.	
	In a list of ordered pairs belonging to a function, the x-coordinate is repeated.	
	If you are given an x-value belonging to a function, you can find the corresponding y-value.	
	This set of ordered pairs is a function $\{(5, -1), (-3, 4), (0, -1), (2, 7)\}$	
	Two points in the graph of a function lie on the same vertical line. They have the same x-coordinate, and the set of ordered pairs is not a function.	

- **Concept Attainment Model**
- **Concept Cards**
- **Error Analysis**
- **Find Your Partner**
- **Grab Bag**
- **Similarities and Differences**

Graphic Organizers page 5

- maps that represent student thinking.
- involve students in skills like sequencing, comparing and classifying to create representations of concepts and processes.
- these mental maps depict complex relationships and can become "blue prints" that make abstract ideas more visible and concrete

Evaluation Purposes:

- They permit the **visual** comparison of student understanding to expert knowledge.
- They illuminate preconceptions.
- They can be used as advanced organizers for students since they help students self-assess their current knowledge.

Thoughts:

- Graphic organizers would be more creative, challenging, and fun than traditional essay or objective style questions on tests.
- Graphic organizers could also be required within presentations and projects.

What Research Says...

Moore and Readence suggested that when students construct their own graphic organizers, they participate actively and process ideas themselves. Further, student-constructed graphic organizers allow teachers to observe level of understanding so that they may provide instructional interventions (Naughton, 1993-94).

"Words are labels—nothing more, nothing less for concepts. A single concept, however, represents much more than the meaning of a single word"

Numbered Heads Together-

page 16

- Each student is assigned a number. Members of group work together to agree on answer. Teacher randomly selects one number. Student with that number answers for group.

Multiple Representations and Connections sample

Verbal Description

Paige is planning to build a model of a train using a scale where 3 inches represents 20 feet. If the train is 80 feet long, what is the length in inches that Paige should build the model of the train?

Concrete/Pictorial

Graphical

Tabular

Algebraic/Symbolic

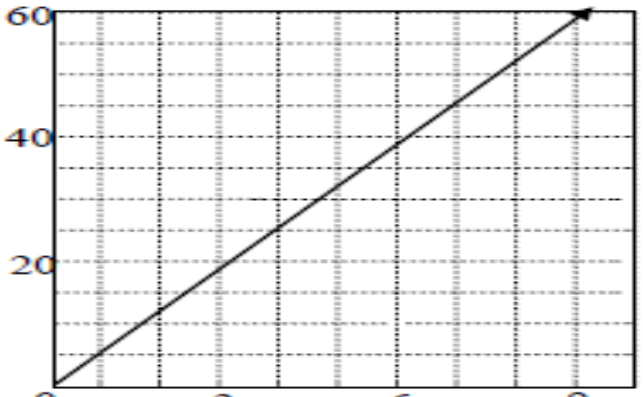
Multiple Representations and Connections sample

Verbal Description

Paige is planning to build a model of a train using a scale where 3 inches represents 20 feet. If the train is 80 feet long, what is the length in inches that Paige should build the model of the train?

Concrete/Pictorial

20 feet	20 feet	20 feet	20 feet



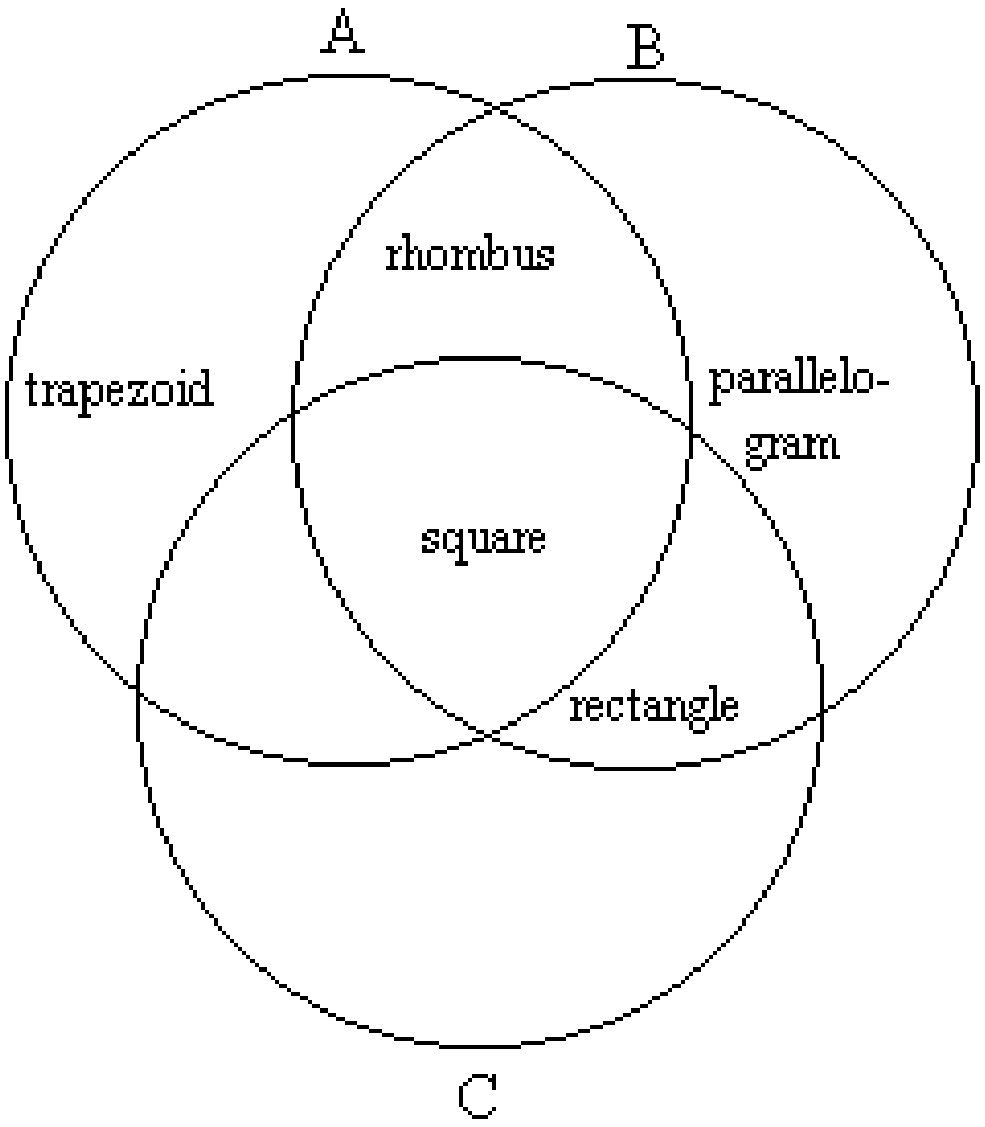
Graphical

Model in Inches	Train in Feet
3	20
6	40
9	60
12	80

Tabular

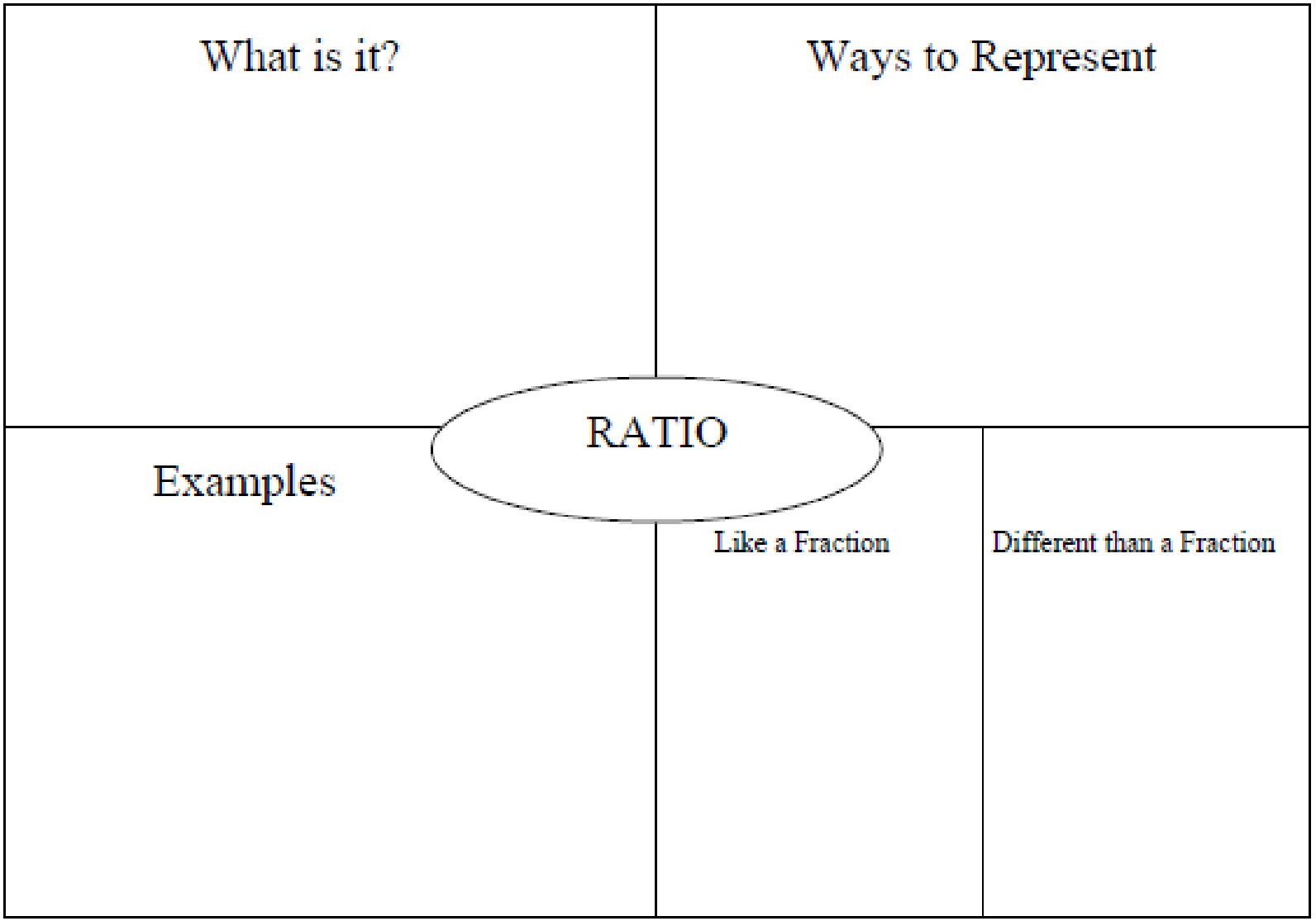
$$\frac{3}{20} = \frac{x}{80}$$

Algebraic/Symbolic


A
B
rhombus
trapezoid
parallelo-
gram
square
rectangle
C

Frayer Model

Name:



Note Taking/Note Making:

NOTE TAKING

What is multiplication?

A simplified way to do repetitive addition.

PICTURE MAKING

6 x 5

six groups of five each

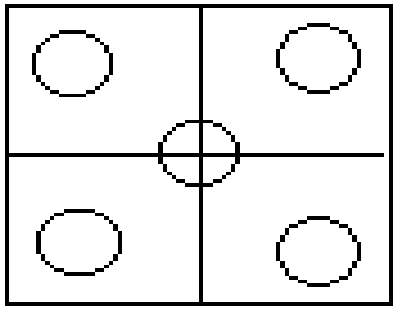
NOTE MAKING

How would you cut a pan of brownies to feed 12 people?

Multiplication is:

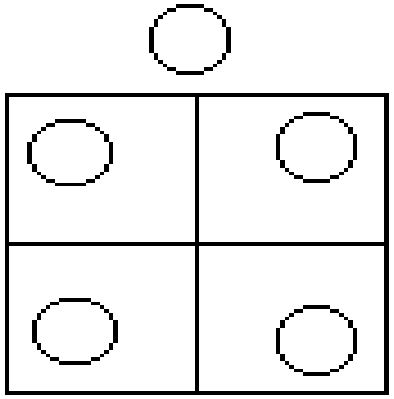
Visual Reminders

5 divided by 4



1 1/4 or 1.25

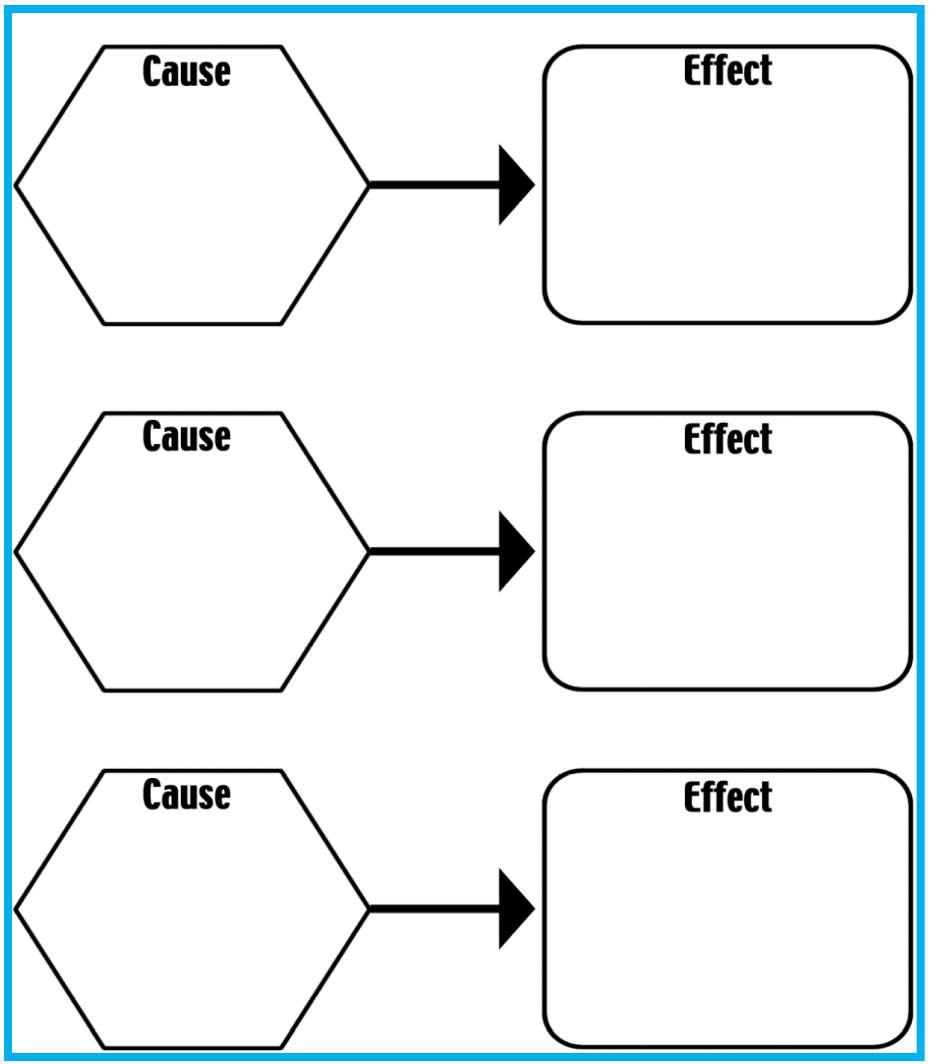
To divide five objects into four groups you get one and one quarter in each group



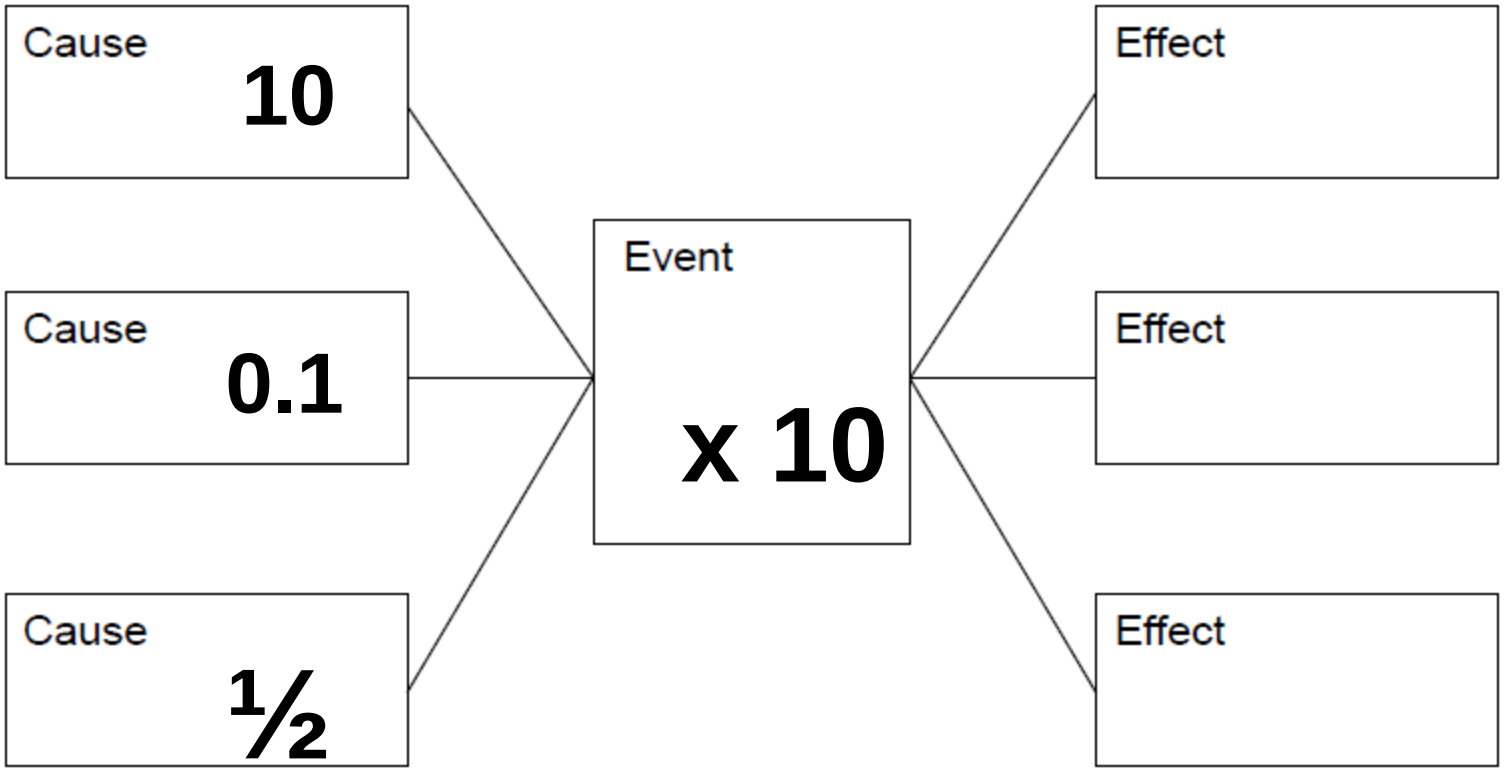
1 remainder 1

To divide five objects into four groups you get one in each group with one remaining.

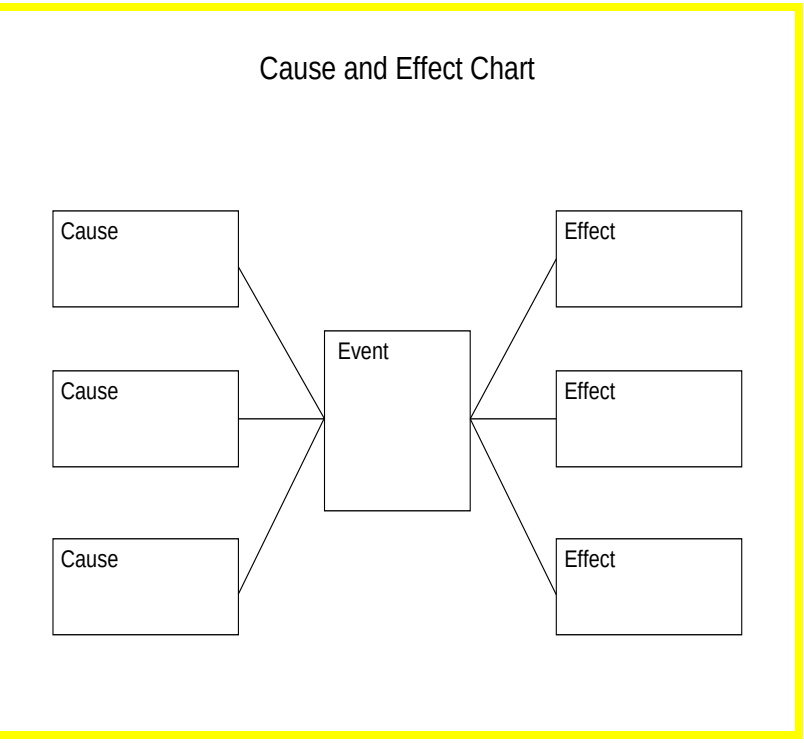
Common Misconception: When you multiply two numbers together, the answer is always bigger than both the original numbers



Cause and Effect Chart



Common Misconception: To multiply by 10, just add a zero



Process Grid

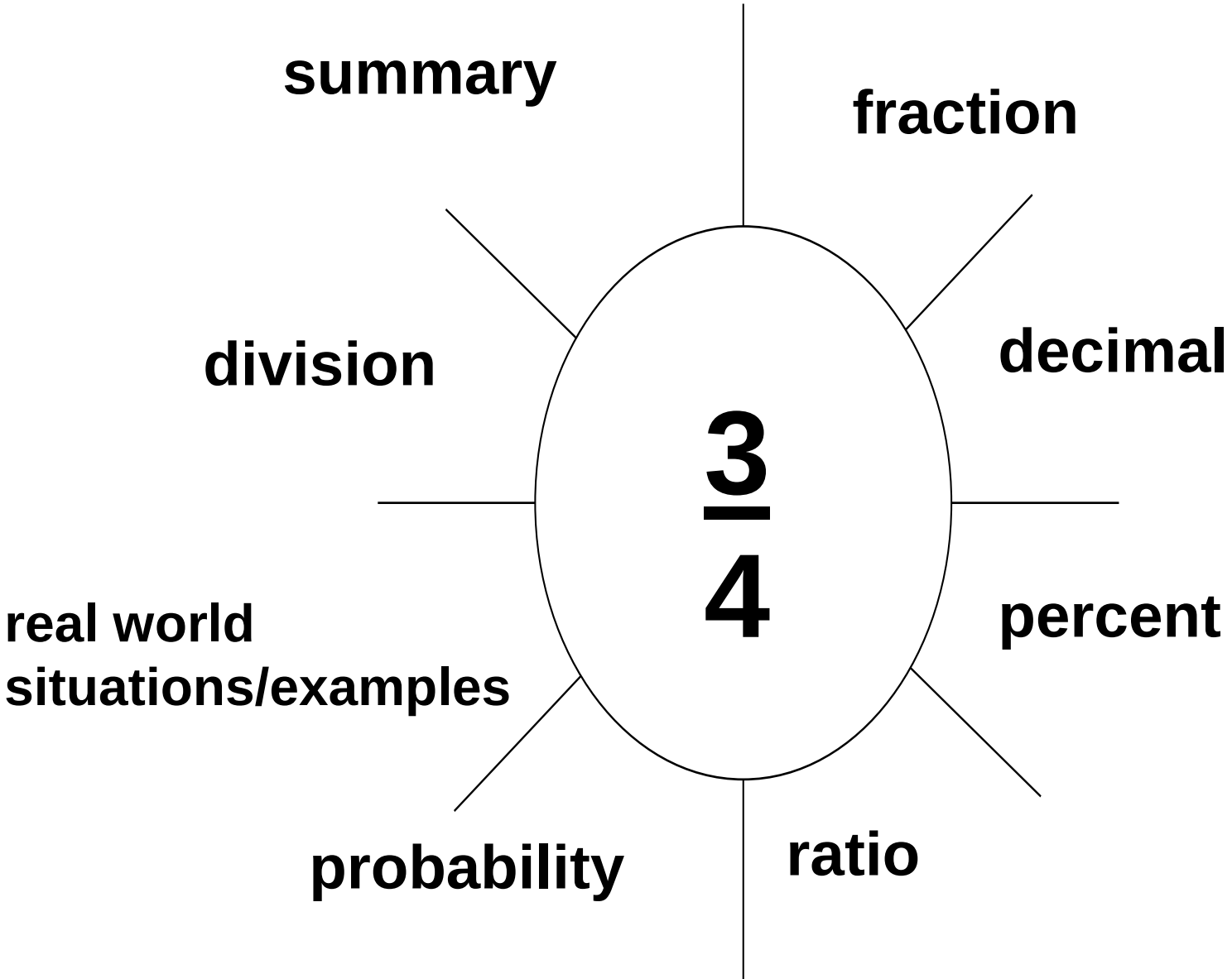
Topic:

Effect	Description	Results or Outcome	Other Interesting Facts

Event

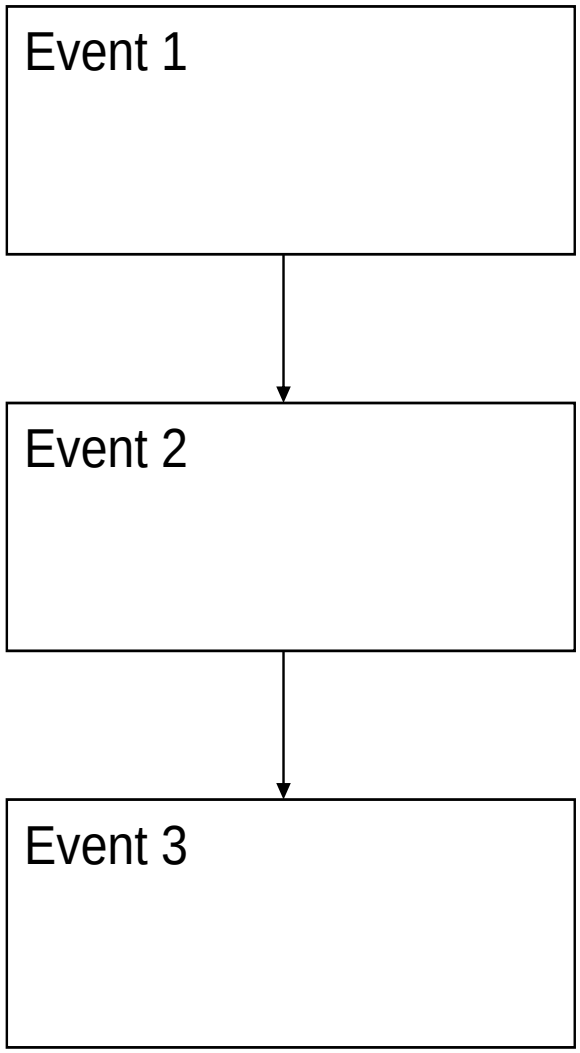
The effects of changes in *m on the graph of* f(x) = mx

Attributes Chart



Chain of Events Chart

Explain the steps to find the product of 435 x 98



First _____

_____

_____

Next _____

_____

_____

Finally _____

_____

_____

Example: Summarize and Interpret text

Summary and Paraphrase

Summary **– a restatement which covers only the main points**
Paraphrase **- a restatement of a text or work giving the meaning in another form**

The summary reduces the passage to just the most important points, and a paraphrase restates it in another more easily understood way.

How to Write a Summary

1. **Read the entire selection.**
2. **Circle the most important words and phrases.**
3. **Write 8 of the most important words or phrases on the lines below.**
4. **Use the list to create a summary restating the main points.**

Jodie wants to buy a shirt regularly priced at $20. The shirt is on sale for 15% off the regular price. Which equation can be used to determine *s, the sale price of the shirt, not* including tax?

_____ _____
_____ _____
_____ _____
_____ _____

Summary:

Process Grid

Topic:

Effect	Description	Results or Outcome	Other Interesting Facts
area 	Find the area of the rectangle		
	Draw a vertical line of symmetry and find the area each new figure		
	Draw a horizontal line of symmetry and find the area each new figure		
	Draw diagonal and find the area each figure		

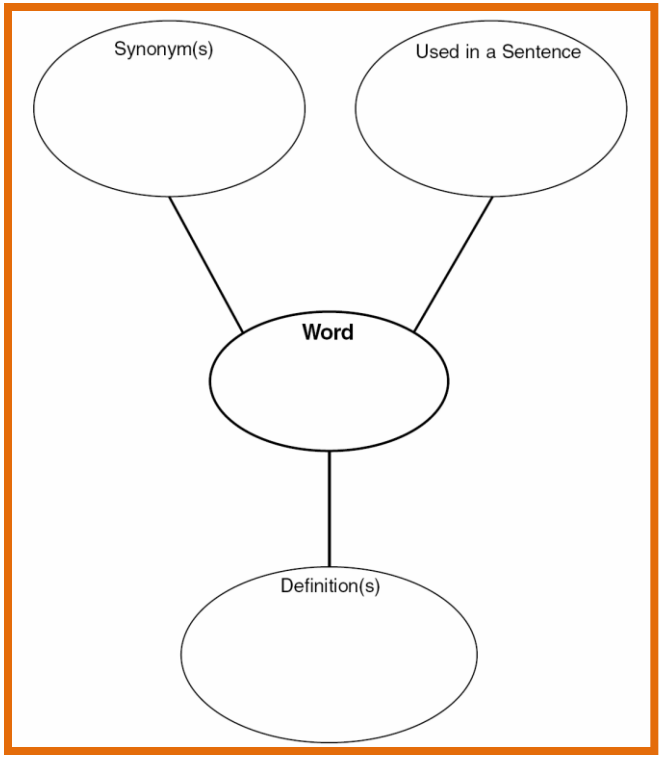
Vocabulary Sketches

Word/Definition	Sketch	Word/Definition	Sketch	Word/Definition	Sketch
integer		ratio		dilation	
negative slope		positive slope		**undefined slope**	

8. Perimeter and area confuse many kids

Vocabulary Sketches

Word/Definition	Sketch	Word/Definition	Sketch	Word/Definition	Sketch



Your Turn…

Select 2 or more items from pages 14-24 to discuss in your group.

Identify what types of interventions you have seen today that would prepare students for the applications you selected.

Group Assignment

Give One Get One-

You have **7 minutes** to get as many ***different*** ideas from members of your group on using information from today with classroom assessments.

Remember, a good teacher makes you think even when you don't want to…

Thank You!